DRW171435AA

Autonics

Modbus Digital Remote I/O Sensor Connector Type

ARM SERIES

INSTRUCTION MANUAL

Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

■ Safety Considerations

※Please observe all safety considerations for safe and proper product operation to avoid hazards.
※⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠**Warning** Failure to follow these instructions may result in serious injury or death.
⚠**Caution** Failure to follow these instructions may result in personal injury or product damage.

⚠ Warning

1. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**
   Failure to follow this instruction may result in fire, personal injury, or economic loss.
2. **Do not disassemble or modify the unit.**
   Failure to follow this instruction may result in fire.
3. **Do not connect, repair, or inspect the unit while connected to a power source.**
   Failure to follow this instruction may result in fire.
4. **Check 'Connections' before wiring.**
   Failure to follow this instruction may result in fire.

⚠ Caution

1. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in fire or product damage.
2. **Use dry cloth to clean the unit, and do not use water or organic solvent.**
   Failure to follow this instruction may result in electric shock or fire.
3. **Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
   Failure to follow this instruction may result in fire or explosion.
4. **Keep metal chip, dust, and wire residue from flowing into the unit.**
   Failure to follow this instruction may result in fire or product damage.
5. **Do not disconnect connector or power, when the product is operating.**
   Failure to follow this instruction may result in fire or malfunction.

■ Ordering Information

AR M – D I 08 N – 4S

Item	**AR**	Autonics Remote I/O
Network	**M**	Basic unit (Modbus RTU)
	X	Expansion unit (DeviceNet/Modbus)
Digital/Analog	**D**	Digital type
I/O type	**I**	Input type
	O	Output type
I/O point	**08**	8 points type
I/O specification	**N**	NPN open collector
	P	PNP open collector
Terminal	**4S**	Sensor Connector 4 PIN Socket

■ Functions

- **Low-speed (16-bit/30CPS) counter function**
- **Auto communication speed recognition**: The unit enables to recognize communication speed automatically when connecting with upper system (PC, PLC).
- **Additional expansion units**: Available to connect expansion units up to 7. I/O points can be expanded up to max. 64.
- **Reading the number of expansion units**: Reads the number of connected expansion units.
- **Reading the unit model name**: Reads the model name of connected units.
- **Reading the unit specification**: Reads the specification of connected units.
- **Setting for address in the EEPROM** : For setting the address, user can set directly in the EEPROM MAC ID parameter besides the rotary switch for address.

※**The above specifications are subject to change and some models may be discontinued without notice.**
※**Be sure to follow cautions written in the instruction manual, communication manual, and the technical descriptions (catalog, homepage).**

■ Model

Model		Specification
Basic unit	Expansion unit	
ARM-DI08N-4S	**ARX-DI08N-4S**	8 points of 10-28VDC NPN input, low-speed counter (10mA/point)
ARM-DI08P-4S	**ARX-DI08P-4S**	8 points of 10-28VDC PNP input, low-speed counter (10mA/point)
ARM-DO08N-4S※	**ARX-DO08N-4S**※	8 points of 10-28VDC NPN output, low-speed counter (0.3A/point)
ARM-DO08P-4S※	**ARX-DO08P-4S**※	8 points of 10-28VDC PNP output, low-speed counter (0.3A/point)

※Low speed counter of digital output type is available only when using with digital input type.

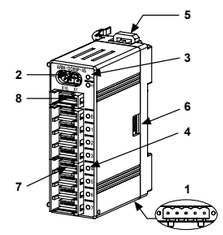
■ Specifications

Model					
	Basic unit	**ARM-DI08N-4S**	**ARM-DI08P-4S**	**ARM-DO08N-4S**	**ARM-DO08P-4S**
	Expansion unit	**ARX-DI08N-4S**	**ARX-DI08P-4S**	**ARX-DO08N-4S**	**ARX-DO08P-4S**
Power supply		Rated voltage: 24VDC⎓, Voltage range: 12-28VDC⎓			
Power consumption		Max. 3W			
I/O points		8 points of NPN input	8 points of PNP input	8 point of NPN output	8 point of PNP output
Control I/O	Voltage	10-28VDC⎓ input		10-28VDC⎓ output (voltage drop: max. 0.5V)	
	Current	10mA/point (sensor current: 150mA/points)		0.3A/point (leakage current: max. 0.5mA)	
	Common	8 points, Common			
Special function (input)		Counter for 16-bit (30CPS※1) (only when using digital input unit of ARM, ARX)			
Communication speed※2		2400, 4800, 9600, 19200, 38400, 57600, 115200bps (default 9600bps)			
Communication method		2 wire half duplex			
Communication distance		Max. 800m			
Multi-drop		Max. 32 multi-drop			
Medium access		POLL			
Application standard		Compliance with EIA RS485			
Protocol		Modbus RTU			
Data bit		8-bit			
Stop bit		1 or 2-bit (default: 2)			
Parity bit		None/Odd/Even (default: none)			
Isolation method		I/O and inner circuit: photocoupler insulation Modbus to internal bus and inner circuit: insulation Unit power: non-insulation			
Insulation resistance		Over 200MΩ (at 500VDC megger)			
Noise immunity		±240V the square wave noise (pulse width: 1us) by the noise simulator			
Dielectric strength		1,000VAC 50/60Hz for 1 minute			
Vibration		1.5mm amplitude at frequency of 10 to 55Hz in each of X, Y, Z directions for 2 hours			
Shock		500m/s² (approx. 50G) in each X, Y, Z direction for 3 times			
Environment	Ambient temp.	-10 to 55℃, storage: -25 to 75℃			
	Ambient humi.	35 to 85%RH, storage: 35 to 85%RH			
Protection structure		IP20 (IEC standards)			
Protection circuit		Surge, Short-circuit, overheat (over 165℃) and static protection, Reversed polarity protection circuit			
		Over current protection circuit (operated at max. 0.17A)		Over current protection circuit (operated at max. 0.7A)	
Indicator		Network status (NS) LED (green, red), Module status (MS) LED (green, red) I/O status LED (input: green, output: red)			
Material		Front case, PC, Body case: PC			
Mounting		DIN rail or screw lock type			
Approval		CE			
Weight※3	Basic	Approx. 123.3g (Approx. 61.8g)	Approx. 123.3g (Approx. 61.8g)	Approx. 123.3g (Approx. 61.8g)	Approx. 123.3g (Approx. 61.8g)
	Expansion	Approx. 117.5g (Approx. 56g)	Approx. 118.5g (Approx. 57g)	Approx. 119.5g (Approx. 58g)	Approx. 120.5g (Approx. 59g)

※1: CPS (counter per second): Specification of accepting external signals per second
※2: The communication speed is automatically set to the communication speed of the Master (PC, PLC, etc.) When changing the communication speed during operation, the network status (NS) LED flashes in red and communication is not possible.
※3: The weight includes packaging. The weight in parentheses is for unit only.
※Environment resistance is rated at no freezing or condensation.

■ Unit Description

◎ Basic unit

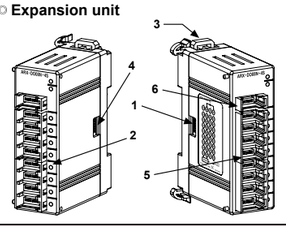


1. **Network connector**

No.	For	Organization
5	24VDC (+)	5: 24VDC 4: GND 3: N·C 2: B 1: A
4	GND	
3	N·C	
2	B	
1	A	

2. **Rotary switch for address**: Rotary switch for using to set an address ×10 represents tens digit and ×1 represents ones digit.
3. **Status LED**: It displays the status of unit (MS) and network (NS).
4. **I/O status LED**: It displays each I/O status.
5. **Rail lock**: It is used for mounting DIN rail or with screw.
6. **Connector output part**: It connects an expansion unit.
7. **Sensor connector**: It is used for connecting external device I/O.
8. **External power connector**: It is used for supplying external power.

◎ Expansion unit

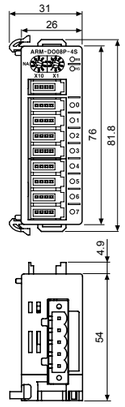


1. **Connector input part**: It connects expansion unit and is joined into expansion connector output.
2. **I/O status LED**: It displays each I/O status.
3. **Rail lock**: It is used for mounting DIN rail or with screw.
4. **Connector output part**: Connector for connecting expansion unit
5. **Sensor connector**: It connects expansion unit.
6. **External power connector**: It is used for supplying external power.

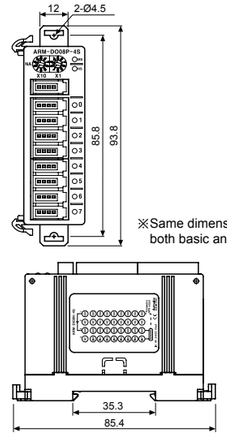
■ Dimensions

(unit: mm)

• Mounting DIN rail



• Mounting with screws

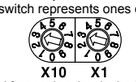


※Same dimensions are applied to both basic and expansion unit.

■ Setup and Installation

⊙**Setting address**
-Setting address is able to be done by rotary switch for address, or by in the EEPROM.
-If the rotary switch for address' number is '00', the address is available to set by in the EEPROM. The others, the desired number of rotary switch is that address.
-The address of the connected unit must not be duplicated.
When changing the address during operation, the unit status (MS) LED flashes in red and the unit communicates to the address before the change.

• **By rotary switch for address**
①Two rotary switches are used for setting address. X10 switch represents tens digit and X1 switch represents ones digit. The address can be set 01 to 99.



E.g.) The X10 and X1 switches point both at '3', the address is '33'.

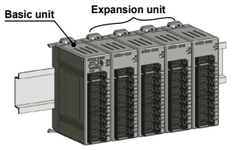
② After setting the desired address, re-supply the unit power for applying the changed address.

• **By in the EEPROM for address**
①During communicate status with upper system (PLC or PC), set the desired address on the 41029 EEPROM MAC ID parameter.
②The set address is changed after unit power is supplied. Re-supply the unit power for applying the changed address.

⊙**Unit Installation**
• **Mounting on panel**
①Pull two Rail locks on the rear part of a unit, there is a fixing screw hole.
②Place the unit on a panel to be mounted.
③Make a hole on a fixing screw hole position.
④Fasten the screw to fix the unit tightly. Please set the tightening torque under 0.5N·m.

• **Mounting on DIN rail**
①Pull two Rail locks on the rear part of a unit.
②Place the unit on DIN rail to be mounted.
③Press Rail locks to fix the unit tightly.

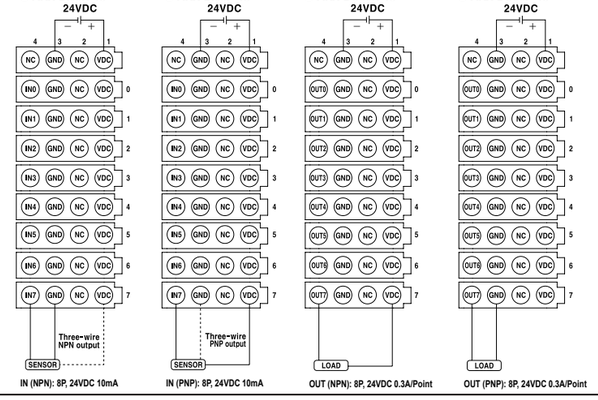
• **Connection of expansion unit**
①Turn OFF the power of a basic unit.
②Remove the cover of connector for extension with nippers.
③Connect connector input part of an expansion unit and connector output part of a basic unit with the connector which is enclosed with an expansion unit box.
④Connected expansion units are installed as the right figure.
⑤Supply power to the basic unit.
※ Re-supply power to the basic unit, and it recognizes expansion units.



⊙**Terminating resistance**
●120Ω ●1% of metallic film ●1/4W
※Connect terminating resistances on the both ends of the network cables. If not connecting terminating resistances, impedance can be too high or low. It may cause network problems.

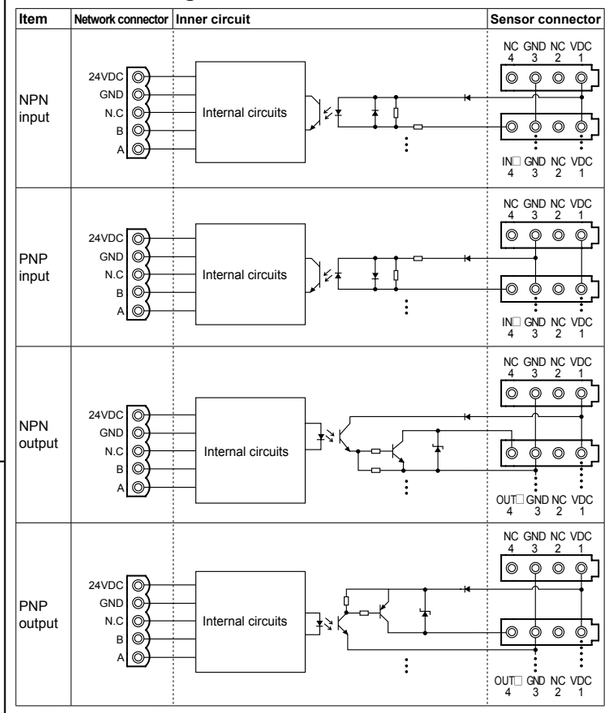
■ Connections

※When wiring the communication connector, use AWG 20 cable and tighten the connector screw with a tightening torque of 0.5N·m.



IN (NPN): 8P, 24VDC 10mA
IN (PNP): 8P, 24VDC 10mA
OUT (NPN): 8P, 24VDC 0.3A/Point
OUT (PNP): 8P, 24VDC 0.3A/Point

■ I/O Circuit Diagram



※IN□: IN0 to IN7, OUT□: OUT0 to OUT7

■ Status LED

(☼: On, ☼: Flash, ●: Off)

Item	Status LED		Description
	Red	Green	
Unit Status (MS) LED	☼	●	Error of expansion units
	☼	●	Error of MAC ID
	●	☼	Normal operation
	●	●	Power is not supplied
Network Status (NS) LED	☼	●	Not supported communication speed (At auto baud rate)
	☼	●	Error of packet
	●	☼	Normal communication
	●	☼	Communication standby

■ Manual

For the detail information and instructions of communication setting and Modbus mapping table, please refer to user manual for communication, and be sure to follow cautions written in the technical descriptions (catalog, homepage).
Visit our homepage (www.autonics.com) to download manuals.

■ Caution during Use

1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
2. 24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
3. Use only designated connector and do not apply excessive power when connecting or disconnecting the connectors.
4. Keep away from high voltage lines or power lines to prevent inductive noise.
   In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line.
   Do not use near the equipment which generates strong magnetic force or high frequency noise.
5. Do not connect or disconnect the expansion unit when power is being supplied.
6. This unit may be used in the following environments.
   ① Indoors (in the environment condition rated in 'Specifications')
   ②Altitude max. 2,000m
   ③Pollution degree 2
   ④Installation category II

■ Major Products

■ Photoelectric Sensors
■ Fiber Optic Sensors
■ Door Sensors
■ Door Side Sensors
■ Area Sensors
■ Proximity Sensors
■ Pressure Sensors
■ Rotary Encoders
■ Connector/Sockets
■ Switching Mode Power Supplies
■ Control Switches/Lamps/Buzzers
■ I/O Terminal Blocks & Cables
■ Stepper Motors/Drivers/Motion Controllers
■ Graphic/Logic Panels
■ Field Network Devices
■ Laser Marking System(Fiber, Co_2, Nd:YAG)
■ Laser Welding/Cutting System
■ Temperature Controllers
■ Temperature/Humidity Transducers
■ SSRs/Power Controllers
■ Counters
■ Timers
■ Panel Meters
■ Tachometers/Pulse(Rate)Meters
■ Display Units
■ Sensor Controllers

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